

REMARKS/ARGUMENTS

This is meant to be a complete response to the Office Action mailed May 23, 2006. In the Office Action, the Examiner rejected claim 1 under 35 U.S.C. § 102(b) as being anticipated by Cosimano (U.S. Patent Number 4,906,198). In addition, the Examiner rejected claims 2, 9-12, 21, 23-26, and 30 under 35 U.S.C. § 102(e) as being anticipated by Selk (U.S. Patent Number 4,906,198). Moreover, the Examiner rejected claims 3-8, 13-16, 27 and 28 under 35 U.S.C. § 103(a) as being unpatentable over Chang (U.S. Patent Number 5,191,174) in view of Frei (U.S. Patent Number 5,342,999). The Office Action dated May 23, 2006, Cosimano, Selk, Chang and Frei have been reviewed. For the reasons set forth below, Applicants believe the claims pending in the application are now in condition for allowance.

Applicant's Response to the 35 U.S.C. § 102(b) Rejection of claim 1

The Examiner rejected claim 1 under 35 U.S.C. § 102(b) as being unpatentable in view of Cosimano. More specifically, the Examiner stated in the above referenced Office Action:

"Cosimano discloses, referring to figure 1, a printed circuit board... characterized by: a hollow (figure 3) through hole (25) having a non-circular shaped cross section normal to a longitudinal axis of the hollow through hole (see col. 3, lines 60-65)...." [Emphasis added]

Applicant respectfully traverses the rejection based on the reasons herein below.

Cosimano, in col.3, lines 55-65, teaches the following:

"As shown in FIG. 1, located within each of the opposed surfaces 15 and 17 of board 11 is a walled opening 25, each of which, as also shown in FIG. 3, is preferably of substantially cylindrical configuration and, significantly, occupies only a predetermined depth within the substance 13 and thus does not pass entirely there through. Being substantially cylindrical in configuration, each opening is defined by an angular, vertical continuous wall 27 and a lower, substantially flat wall 29. It is understood that other configurations for opening 25 are readily possible, including oval, elliptical and rectangular." [Emphasis added]

Applicant's claim 1 recites printed circuit board characterized by "a hollow through hole having a non-circular shaped cross section normal to a longitudinal axis of the hollow through hole...." Applicant agrees with the examiner that Cosimano teaches a hole (25) having a non-circular shape (col. 3, lines 64-66). On the other hand, Cosimano teaches a hole (25) that "occupies only a predetermined depth within the substance 13 and thus does not pass entirely there through...." Thus, applicant respectfully disagrees with the examiner that Cosimano describes a through hole having a non-circular shape. Therefore, Cosimano does not teach or suggest Applicant's claim 1 printed circuit board characterized by a through hole having a non-circular shape.

In light of the foregoing, it is Applicant's belief that claim 1 is patentable under 35 U.S.C. § 102(b) over the teachings of Cosimano. Therefore, reconsideration and withdrawal of the rejection of claim 1 is respectfully requested.

Applicant's Response to the 35 U.S.C. § 102(b) Rejection of claim 1

The Examiner rejected claims 2, 9-12, 21, 23-26, and 30 under 35 U.S.C. § 102(e) as being unpatentable in view of Selk. More specifically, the Examiner noted:

"Selk discloses, referring primarily to figure 3a, a printed Circuit Board... characterized by: a trench (72, 74) ... extending through a plurality of printed circuit boards layers to a grounding plane (50)... wherein the trench completely surrounds an area of the printed circuit board (col. 4, lines 50-55)...."

Applicant respectfully traverses the rejection based on the reasons herein below.

Selk, in col.4, lines 45-53, discloses:

"A first groove 72 is shown routed on one side of the second signal layer 44. Groove 72 is routed through the outer layers and extends up to or partially through the conductive base layer 50 located at the middle of the printed wiring board 40. Likewise, a second groove 74 is routed through the same layers on the opposite side of the second signal layer 44 in a similar manner. These grooves may further be joined beyond the termination points of the signal traces and thereby further surround the signal layer." [Emphasis added]

Claims 2, 9, 21, 25 and 30 have been amended to clarify Applicant's inventive concept. More specifically, claims 2, 9, 21, 25 and 30 have been amended to recite a printed circuit board characterised by a trench that "completely surrounds an area and extends adjacent to the perimeter of the printed circuit board . . ." It should be noted that claims 2, 9, 21, 25 and 30 have not been amended for any purpose related to patentability.

Selk teaches a printed circuit board characterised by a groove which

extends through a plurality of printed circuit board layers to a grounding plane. Selk explicitly describes the groove to be "located at the middle of the printed wiring board 40" (col. 4, lines 48-49). Therefore, Selk does not teach the printed circuit board recited in Applicant's amended claims 2, 9, 21, 25 and 30, which is characterised by a trench that ""completely surrounds an area and extends adjacent to the perimeter of the printed circuit board . . ."" Therefore, Selk does not teach or describe Applicant's printed circuit board of claims 2, 9, 21, 25, and 30.

It should be noted that claims 11 and 12 depend from independent claim 9; claims 23 and 24 depend from independent claim 21; and claim 26 depend from independent claim 25. Therefore, claims 11, 12, 23, 24, and 26 contain each and every limitation of their respective independent claim. Claims 9, 21, and 25 are all discussed above. Thus, no further comments concerning claims 11, 12, 23, 24, and 26 are deemed necessary herein to be fully responsive to the Office Action dated May 23, 2006.

In light of the foregoing, it is Applicant's belief that claims 2, 9-12, 21, 23-26, and 30 are patentable under 35 U.S.C. § 102(e) over the teachings of Selk. Therefore, reconsideration and withdrawal of the rejection of the claims 2, 9-12, 21, 23-26, and 30 is respectfully requested.

**Applicant's Response to the 35 U.S.C. § 103(a) Rejection of claims 3-8,
13-16, 27, and 28**

In the Office Action dated May 23, 2006, the Examiner rejected claims 3-8, 13-16, 27, and 28 under 35 U.S.C. § 103(a) as being unpatentable over Chang in view of Frei. More specifically, the Examiner noted:

"Chang does not specifically state that the holes have a non-circular cross section [claim 3]. However it is well known in the art to form hollow through holes in non-circular shapes as evidence by Frei (see col. 6, lines 35-40)."

Applicant respectfully traverses the rejection based on the reasons herein below.

As the Examiner is aware, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claimed limitations. The teaching or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F. 2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Chang teaches a high density circuit board and a method for making a high density circuit board. Applicant agrees with the examiner that Chang does not

teach or suggest Applicant's printed circuit board of claims 3, 13, and 16, which is characterized by a hole having a non-circular cross section. In addition, Chang does not mention or suggest adapting semiconductor die pads. On the other hand, Frei teaches an apparatus and a method for adapting semiconductor die pads. Frei does not teach or suggest a high density circuit board.

Accordingly, it is Applicant's opinion that neither Chang nor Frei suggest or show a motivation for modifying the reference or to combine the reference teachings. In addition, it is Applicant's opinion that there is no evidence in either prior art that shows a "reasonable expectation of success" in combining the references. Thus, it is Applicant's belief that a *prima facie* case of obviousness has not been provided.

The courts have repeatedly stated that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. V. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983).

Frei leads away from the teaching of Chang. Chang describes a circuit board that stresses the importance of the diameters and the alignments of the through-holes (col. 5, line 53 – col. 6, line 50). Frei, on the other hand, teaches through-holes that are substantially aligned (col. 6, lines 67-68). In addition, Frei explicitly teaches that the precise diameter of the holes through the layers is "relatively unimportant" (col. 6 lines 28-29). Therefore, Frei teaches away from Chang's claimed invention. Thus, it is Applicant's belief that a *prima facie* case of

obviousness has not been provided.

In light of the foregoing, it is Applicant's belief that claims 3, 13, and 16 are patentable under 35 U.S.C. § 103(a) over the teachings of Chang in view of Frei. Therefore, reconsideration and withdrawal of the rejection of the claims 3, 13, and 16 is respectfully requested.

It should be noted that claims 4-8, 27, and 28 depend from independent claim 3 and claims 14 and 15 depend from independent claim 13. Thus, claims 4-8, 14, 15, 27, and 28 contain each and every limitation of their respective independent claims. Claims 3 and 13 are discussed above. Thus, no further comments concerning claims 4-8, 14, 15, 27, and 28 are deemed necessary herein to be fully responsive to the Office Action dated May 23, 2006.

In light of the foregoing, it is Applicant's belief that a prima facie case of obviousness has not been provided. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 3-8, 13-16, 27, and 28.

CONCLUSION

The foregoing is meant to be a complete response to the Office Action mailed May 23, 2006. It is respectfully submitted that this application, as now amended, is in condition for allowance for the reasons stated above. Therefore, it is requested that the Examiner reconsider each and every rejection as applicable to the claims now pending in the application and pass such claims to issue.

This amendment is intended to be a complete response to the Office Action dated May 23, 2006. In the event that any outstanding issues remain that would delay the allowance of this application, the examiner is urged to contact the undersigned to telephonically discuss such outstanding issues.

Respectfully submitted,

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